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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/397,967	09/17/99	IHLE J	0656.0370004

HM12/0228
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EXAMINER	
NGUYEN,Q	
ART UNIT	**PAPER NUMBER**
1632	5

DATE MAILED: 02/28/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/397,967	IHLE ET AL.	
	Examiner	Art Unit	
	Quang Nguyen	1632	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25,26 and 28-51* is/are pending in the application.

4a) Of the above claim(s) *25,32-34 and 44* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *26,28-31, 35-43, and 45-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

DETAILED ACTION

Note that the specification as filed does not contain claim 49 (See preliminary amendment filed 9/17/1999 in paper no. 2). Per 35 CFR 1.126, originally filed claims "50-52" have been renumbered as claims 49-51.

Applicant's election **without traverse** of Group I in paper no. 4 is acknowledged.

Claims 25, 32-34 and 44, drawn to non-elected inventions, are withdrawn from further consideration in this application.

Claims 26, 28-31, 35-43 and 45-51 are examined on the merits herein.

Sequence compliance

The disclosure is objected to because of the following informalities: The specification contains sequence listings. The nucleotide sequence disclosure contained in this application does not comply with the requirements for such a disclosure as set forth in 37 C.F.R. 1.821 - 1.825. Applicant's attention is directed to the final rulemaking notice published at 55 FR 18230 (May 1, 1990), and 1114 OG 29 (May 15, 1990). If the effective filing date is on or after July 1, 1998, see the final rulemaking notice published at 63 FR 29620 (June 1, 1998) and 1211 OG 82 (June 23, 1998).

Please note that recited sequences in the claims must be identified with proper SEQ ID NOs. Appropriate correction is required.

Cl im R jections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> **The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.**

Claims 35, 39-41, 43 and 45-46 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an isolated DNA molecule comprising a DNA sequence encoding the JAK3 kinase amino acid sequence of SEQ ID NO:16 capable of undergoing tyrosine phosphorylation by at least one cytokine or having cytokine receptor binding activity; the same wherein said molecule encodes a JAK3 kinase that is at least 80-99% homologous to the amino acid sequence of SEQ ID NO:16; an expression vector comprising any of said isolated DNA molecule and an isolated host cell comprising the same expression vector, does not reasonably provide enablement for other embodiments in the claims. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

The factors to be considered in the determination of an enabling disclosure have been summarized as the quantity of experimentation necessary, the amount of direction or guidance presented, the state of the prior art, the relative skill of those in the art, the predictability or unpredictability of the art and the breadth of the claims. *Ex parte Forman*, (230 USPQ 546 (Bd Pat. Appl & Unt, 1986); *In re Wands*, 858 F.2d 731, 8 USPQ 2d 1400 (Fed. Cir. 1988)).

Claims 35, 39-40 and 45-46 are directed to an isolated DNA molecule comprising a DNA sequence encoding JAK3 kinase or a JAK3 kinase peptide, wherein said peptide has JAK kinase activity and undergoes tyrosine phosphorylation at least one cytokine; the same wherein said molecule encodes a polypeptide corresponding to at least a 15 to 400 amino acid fragment or at least a 5 to 335 amino acid fragment of the amino acid sequence of SEQ ID NO:16 and wherein said polypeptide having JAK kinase activity and a tyrosine that is phosphorylated following IL-2 or IL-4 stimulation; an expression vector comprising said isolated DNA molecule and an isolated host cell comprising the same vector. Claim 43 is drawn to an isolated DNA molecule comprising a DNA sequence encoding a JAK kinase peptide, said peptide having cytokine receptor binding activity.

With respect to the nature of the elected invention, the specification discloses the cloning of full-length cDNAs encoding for mouse JAK1, JAK2 and JAK3 kinases. The specification further demonstrates that JAK2 kinase is capable of associating with erythropoietin receptor or growth hormone receptor and it is phosphorylated and activated in response to erythropoietin, growth hormones, IL-3 and interferon-γ. The specification also teaches that JAK3 kinase is tyrosine phosphorylated and activated in response to IL-2 to IL-5, IL-7, IL-9, IL-11, G-CSF and GM-CSF in selected cells. Ciliary neurotrophic factor and related factors have also been shown to induce tyrosine phosphorylation of JAK1, JAK2 and Tyk2 in EW1 cells, and that these JAK kinases are probably associated with the membrane proximal region of the CNTF β receptor components.

The above evidence is noted and considered. However, the instant specification is not enabled for the broadly claimed invention for the following reasons. With regard to the breadth of the claims encompassing DNA sequence encoding any and all JAK3 kinase or JAK3 kinase peptide, apart from the disclosure of a mouse cDNA sequence encoding JAK3 kinase of the amino acid sequence of SEQ ID NO:16, the specification fails to teach specifically other cDNA sequences encoding non-mouse Jak3 kinases. For examples, the instant specification does not teach the cloning, isolation and characterization of cDNA sequences encoding for human JAK3 kinase of Kawamura et al. (Proc. Natl. Acad. Sci. 91:6374-6378, 1994), Civin et al. (U.S. Patent No. 5,705,625 with the effective filing date of December 15, 1994), Rane & Reddy (Oncogene 9:2415-2423, 1994) or that encoding for rat JAK3 kinase of Takahashi & Shirasawa (FEBS Letters 342:124-128, 1994) and their derived JAK3 kinase peptides. With the lack of guidance or teachings provided by the instant specification, it would therefore have required undue experimentation for a skilled artisan to make and use the full scope of the broadly claimed invention.

The claims also encompass an isolated DNA molecule comprising a DNA sequence encoding any and all JAK3 kinase peptide, a polypeptide corresponding to at least a 15 to 400 amino acid fragment or a 5 to 335 amino acid fragment of SEQ ID NO:16 which exhibit JAK kinase activity and undergo tyrosine phosphorylation by at least one cytokine, preferably IL-2 or IL-4, and any and all JAK kinase peptide having cytokine receptor binding activity. However, the specification fails to teach specifically which JAK3 kinase peptide, which 15 to 400 amino acid fragment, which 5 to 335 amino

acid fragment and which JAK kinase peptide display the aforementioned activities. The specification merely demonstrates that full length JAK3 kinase is tyrosine phosphorylated and activated in response to various interleukins, G-CSF and GM-CSF in selected cells, as well as the tyrosine phosphorylation, activation and association with erythropoietin receptors and CNTF β receptor components for full length JAK1 and JAK2 kinases under certain conditions. It is further noted that the claims do not even recite any critical elements involved in JAK kinase activity or cytokine receptor binding activity that the encoded JAK kinase peptides need to possess. It is well recognized in the art, any modification (even a "conservative" substitution) to a critical structural region of a protein is likely to significantly alter its functional properties, let alone any extensive deletion or fragmentation or substitution or insertion. The present disclosure offers no guidance as to which regions of the JAK molecule would be tolerant of alteration or fragmentation and which would not, which "particular" amino acid changes at which position and at which combinations, such that the kinase peptides possessing the desired activities as claimed could be obtained. There is a high degree of unpredictability associated with the make and use of the claimed embodiment. In discussing peptide hormones, Rudinger has stated that "The significance of particular amino acids and sequences for different aspects of biological activity can not be predicted a priori but must be determined from case to case by painstaking experimental study (Page 6, first sentence of Conclusions *In* J.A. Parsons, ed. "Peptide hormones", University Park Press, 1976). This unpredictability is further underscored by the fact that the relationship between the sequence of a peptide and its tertiary

structure (or its activity) is not well understood and is not predictable (Ngo et al., *In* K. Merz et al., ed. "The protein folding problem and tertiary structure prediction", Birkhauser, 1994, 491-495). Moreover, the physiological art is recognized as unpredictable (MPEP 2164.03). As set forth in *In re Fisher*, 166 USPQ 18 (CCPA 1970), compliance with 35 USC 112, first paragraph requires:

> That scope of claims must bear a reasonable correlation to scope of enablement provided by specification to persons of ordinary skill in the are; in cases involving predictable factors, such as mechanical or electrical elements, a single embodiment provides broad enablement in the sense that, once imagined, other embodiments can be made without difficulty and their performance characteristics predicted by resort to known scientific laws; in cases involving unpredictagle factors, such as most chemical reactions and physiological activity, scope of enablement varies inversely with degree of unpredictablity of factors involved.

Accordingly, due to the lack of guidance or direction provided by the specification, the unpredictability of the art on the protein/peptide folding and tertiary structure prediction, the breadth of the instant claims, it would have required undue experimentation without a predictable expectation of success for one skilled in the art to make and use the full scope of the broadly claimed invention.

Written Description

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 26, 30-31, 35-37, 40, 43 and 45-46 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the

inventor(s), at the time the application was filed, had possession of the claimed invention.

Vas-Cath Inc. v. Mahurkar, 19USPQ2d 1111 (Fed. Cir. 1991), clearly states that "applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession *of the invention*. The invention is, for purposes of the 'written description' inquiry, *whatever is now claimed.*" Vas-Cath Inc. v. Mahurkar, 19USPQ2d at 1117. The specification does not "clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed."Vas-Cath Inc. v. Mahurkar, 19USPQ2d at 1116.

Applicant's invention is drawn to an isolated DNA molecule comprising a DNA sequence encoding a JAK kinase capable of undergoing tyrosine phosphorylation by at least one cytokine, and expression vector comprising the same and a host cell transformed with the same expression vector. The claimed invention is also directed to an isolated DNA molecule comprising a DNA sequence encoding a JAK3 kinase or a JAK3 kinase peptide, wherein said peptide has JAK kinase activity and undergoes tyrosine phosphorylation by at least one cytokine, an expression vector comprising the same DNA molecule and an isolated host cell comprising the expression vector, as well as an isolated DNA molecule comprising a DNA sequence encoding a JAK kinase peptide having cytokine receptor binding activity. Apart from the disclosure of cDNA sequences encoding mouse JAK1, JAK2 and JAK3 kinases in the present application, and known cDNA sequences encoding for human JAK1 and Tyk2 in the art at the effective filing date of the instant invention, the specification fails to disclose or

anticipate the presence of any other nucleotide sequences coding for other JAK kinases. As the scope of the instant claims would encompass the cDNA sequences encoding for rat or human or other non-mouse mammalian JAK2 or JAK3 kinases. Certainly, the instant invention does not teach the cDNA sequences encoding for human JAK2 kinase of Coleman et al. (U.S. Patent No. 5,914,393) and human JAK3 kinase of Civin et al. (U.S. Patent No. 5,705,625), Kawamura et al. (Proc. Natl. Acad. Sci. 91:6374-6378, 1994), Rane & Reddy (Oncogene 9:2415-2423, 1994) or that encoding for rat JAK3 kinase of Takahashi & Shirasawa (FEBS Letters 342:124-128, 1994). All of these cDNA sequences were just known at about the effective filing date of the present application or shortly thereafter. The claimed invention as a whole is not adequately described if the claims require essential or critical elements which are not adequately described in the specification and which are not conventional in the art as of Applicants' filing date. Possession may be shown by actual reduction to practice, clear depiction of the invention in a detailed drawing, or by describing the invention with sufficient relevant identifying characteristics such that a person skilled in the art would recognize that the inventor had possession of the claimed invention. Pfaff v. Wells Electronics, Inc., 48 USPQ2d 1641, 1646 (1998). The skilled artisan cannot envision the detailed structure of the broadly claimed isolated DNA molecule comprising a DNA sequence encoding a JAK kinase or a JAK kinase peptide, expression vectors and isolated host cells comprising the same, and therefore conception is not achieved until reduction to practice has occurred, regardless of the complexity or simplicity of the method. Adequate written description requires more than a mere statement that it is

part of the invention and reference to a potential method of isolating it. See *Fiers v. Revel*, 25 USPQ2d 1601, 1606 (Fed. Cir. 1993) and *Amgen Inc. v. Chugai Pharmaceutical Co. Ltd.*, 18 USPQ2d 1016 (Fed. Cir. 1991). One cannot describe what one has not conceived. See *Fiddes v. Baird*, 30 USPQ2d 1481, 1483.

Applicant is reminded that *Vas-Cath* makes clear that the written description provision of 35 U.S.C. §112 is severable from its enablement provision (see page 1115).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

Claims 28-29, 31 and 37-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 28, it is unclear what is encompassed by the phrase "a DNA sequence corresponding to a portion of Figure 6 (SEQ ID NO:)". Without specifying which SEQ ID NO and none of the sequences listed in Figure 6 is a DNA sequence, the claim is clearly indefinite.

In claim 29, it is unclear what is encompassed by the phrase "derived from". Does it mean the entire claimed sequence is that of murine JAK2 gene sequence of SEQ ID No. 8 or the claimed sequence can be a portion of the JAK2 sequence? Clarification is requested.

In claim 31, it is unclear what is encompassed by the phrase "a host transformed with the expression vector". Is it a bacterial cell transformed with the expression vector of the instant invention or a transgenic cell whose genome comprises the expression vector. The scope of the claim is unclear. For the purpose of a compact prosecution, it is interpreted as a host cell transformed with the expression vector of the present invention.

In claim 37, it is unclear by the phrase "the isolated DNA molecule of claim 36, wherein said molecule encoded by said DNA has only one amino acid substitution". A DNA molecule encoded by said molecule? What is it? Clarification is needed.

Claim 38 is indefinite because it is unclear which polypeptides recited in the claim correspond to which amino acid sequences listed in Figure 6. In addition, the amino acid sequences listed in the claim are not identified by any SEQ ID NO, it is truly confusing. The metes and bounds of the claim can not be clearly determined. Clarification is needed.

In claims 39 and 41, it is unclear what is encompassed by the term "corresponding". Does it mean the entire encoded polypeptide or only part of the encoded polypeptide contain at least a 15 to 400 amino acid fragment or a 5 to 335 amino acid fragment of the referred amino acid sequence? Also in claim 41, the phrase "the amino acid sequence shown on Figure 6" is unclear. Figure 6 lists 4 different amino acid sequences. Which amino acid sequence? Furthermore without identifying the proper amino acid sequence with a SEQ ID NO., the claim is unclear and indefinite. The metes and bounds of these claims can not be clearly determined.

In claim 40, the entire claim is indefinite. How can an isolated DNA molecule encodes a polypeptide that is at least 80-99% homologous to an amino acid sequence encoded by itself? Clarification is needed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 26 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Harpur et al. (Oncogene 7:1347-1353, 1992) or Firmbach-Kraft et al. (Oncogene 5:1329-1336, 1990).

The claims are drawn to an isolated DNA molecule comprising a DNA sequence encoding a JAK kinase capable of undergoing tyrosine phosphorylation by at least one cytokine; the same wherein said DNA molecule comprising a DNA sequence corresponding to a portion of Fig. 6.

Harpur et al. disclose the isolation of a cDNA clone encoding for an extensive portion of murine JAK2 comprising the two putative kinase domains (See abstract and Fig. 1). Firmbach-Kraft et al. teach the cloning and isolation of a full-length cDNA encoding for human *Tyk2*, a member of the JAK kinase family (See abstract and Fig. 1).

Both disclosed murine JAK2 cDNA sequence and human *Tyk* 2 cDNA sequence encode portions of the amino acid sequences listed in Figure 6 of the instant specification. It is the inherent property of the proteins encoded by the murine JAK2 cDNA and human *Tyk2* cDNA taught by Harpur et al. and Firmbach-Kraft et al., respectively, to undergo tyrosine phosphorylation by at least one cytokine. Therefore, the references clearly anticipate the claimed invention.

Claim 26 is rejected under 35 U.S.C. 102 (b) as being anticipated by Wilks et al. (Mol. Cell. Biol. 11: 2057-2065, 1991).

Wilks et al. teach the isolation of a full length human JAK1 kinase cDNA encoding for a novel protein comprising two phosphotransferase-related catalytic domain (See abstract and Fig. 2). It is the inherent property of the full length JAK1 kinase encoded by the cDNA clone taught by Wilks et al. to undergo tyrosine phosphorylation by at least one cytokine. Therefore, Wilks et al. clearly anticipate the claimed invention.

Claims 26, 28 and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Wilks et al. (U.S. Patent No. 5,658,791 with the effective filing date of June 30, 1993).

The claims are drawn to an isolated DNA molecule comprising a DNA sequence encoding a Jak kinase capable of undergoing tyrosine phosphorylation by at least one cytokine; the same wherein said DNA molecule comprising a DNA sequence

corresponding to a portion of Fig. 6 or said DNA sequence is derived from the murine JAK2 gene sequence as shown in SEQ ID NO. 8.

Wilks et al. disclose the isolation of a cDNA clone encoding for an extensive portion of murine JAK2 comprising the two putative kinase domains (See example 3 in columns 13-14 and Sequence 2 in columns 25-32). The disclosed murine JAK2 cDNA sequence encodes a portion of the amino acid sequence of JAK2 listed in Figure 6 of the instant specification. It is the inherent property of the protein comprising the two kinase related domains, encoded by the murine JAK2 cDNA taught by Harpur et al. to undergo tyrosine phosphorylation by at least one cytokine. Moreover, the disclosed sequence has 80.9% homology and 97% best local similarity to SEQ ID NO. 8 and therefore it can be considered to be derived from SEQ ID NO. 8. Therefore, the reference clearly anticipates the claimed invention.

Claims 35, 39-42, 47, 49-51 are rejected under 35 U.S.C. 102(a) as being anticipated by Kawamura et al. (Proc. Natl. Acad. Sci. 91:6374-6378, 1994) or Takahashi & Shirasawa (FEBS Letters 342:124-128, 1994).

The claims are drawn to an isolated DNA molecule comprising a DNA sequence encoding JAK3 kinase or a JAK3 kinase peptide, wherein said peptide has JAK kinase activity and undergoes tyrosine phosphorylation by at least one cytokine (preferably IL-2 or IL-4); the same wherein said molecule encodes a polypeptide corresponding to at least a 15 to 400 amino acid fragment or 5 to 335 amino acid fragment of the amino acid sequence of SEQ ID NO. 16; or the same wherein said molecule encodes a

polypeptide that is at least 80-99% homologous to an amino acid sequence of SEQ ID NO. 16; or the same wherein said DNA molecule hybridizes to DNA sequence encoding amino acid sequence SEQ ID NO. 16; or the same wherein said molecule encodes a JAK3 kinase polypeptide that is at least 80-90% or 80-99% homologous to the amino acid sequence of SEQ ID NO. 16 and wherein the percent homology is determined using a GAP computer program with recited parameters; or the same wherein said molecule comprises at least 50 nucleotides or at least 60 nucleotides encoding the amino acid sequence of SEQ ID NO. 16.

Kawamura et al. teach molecular cloning of human L-JAK (JAK3) cDNA encoding for a kinase comprising two tandem nonidentical catalytic domains with a molecular weight of about 125,000 Da (See abstract, Fig. 1 and the disclosed GenBank accession no. U09607 at the bottom of page 6374). Takahashi & Shirasawa disclose a cDNA encoding for rat JAK3 kinase comprising a protein tyrosine kinase domain and a second kinase-related domain characteristic of JAK kinase (See abstract and Fig. 1 with the disclosed GenBank accession no. D28508). It is the inherent property of the polypeptides encoded by the cDNA clones taught by Kawamura et al. and Takahashi & Shirasawa to have JAK kinase activity and they undergo tyrosine phosphorylation by at least one cytokine, including IL-2 or IL-4. The isolated cDNA sequences of Kawamura et al. and Takahashi & Shirasawa have 85.8% and 95.5% similarity to SEQ ID NO. 16, respectively, using a GAP computer program having default parameters recited in the claims (See attached sequence alignments). The disclosed sequences encode polypeptides having at least a 5 to 355 amino acid fragment or a 15 to 400 amino acid

fragment of the amino acid sequence of SEQ ID NO. 16. At the same time, the disclosed sequences comprise at least 50 nucleotides or at least 60 nucleotides encoding an amino acid sequence of SEQ ID NO. 16. Futhermore, given high percentages of homology between the polypeptides encoded by cDNA sequences of Kawamura et al. and Takahashi & Shirasawa and the polypeptide of SEQ ID NO. 16, the disclosed cDNA sequences would hybridize to the DNA sequence encoding SEQ ID NO. 16 under conditions recited in the claim. Therefore, the references meet all the limitations recited in the claims, and thus Kawamura et al. and Takahashi & Shirasawa clearly anticipate the instant claimed invention.

Claims 43 and 48 are rejected under 35 U.S.C. 102(a) as being anticipated by Kawamura et al. (Proc. Natl. Acad. Sci. 91:6374-6378, 1994) or Takahashi & Shirasawa (FEBS Letters 342:124-128, 1994).

The claims are directed to an isolated DNA molecule comprising a DNA sequence encoding a JAK kinase peptide, said peptide having cytokine receptor binding activity, and the same isolated DNA molecule wherein said molecule encodes a JAK3 kinase polypeptide that is at least 80-99% homologous to the amino acid sequence of SEQ ID NO:16 and wherein the percent homology is determined using a GAP computer program having default parameters recited in the claim.

Kawamura et al. teach molecular cloning of human L-JAK (JAK3) cDNA encoding for a kinase comprising two tandem nonidentical catalytic domains with a molecular weight of about 125,000 Da (See abstract, Fig. 1 and the disclosed GenBank

accession no. U09607 at the bottom of page 6374). Takahashi & Shirasawa disclose a cDNA encoding for rat JAK3 kinase comprising a protein tyrosine kinase domain and a second kinase-related domain characteristic of JAK kinase (See abstract and Fig. 1 with the disclosed GenBank accession no. D28508). The isolated cDNA sequences of Kawamura et al. and Takahashi & Shirasawa have 85.8% and 95.5% similarity to SEQ ID NO. 16, respectively, using a GAP computer program having default parameters recited in the claims (See attached sequence alignments). Since a JAK kinase peptide is broadly defined as any subset of a JAK kinase having JAK kinase activity (See instant specification, page 20, lines 4-6) and in light of the scope of claim 48, the teachings of Kawamura et al. and Takahashi & Shirasawa meet the limitations recited in the claims. With respect to cytokine receptor binding activity, it is an inherent property of the polypeptides encoded by cDNA clones disclosed by Kawamura et al. and Takahashi & Shirasawa. Therefore, the references clearly anticipate the instant claimed invention.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 26, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harpur et al. (Oncogene 7:1347-1353, 1992) or Wilks et al. (Mol. Cell. Biol. 11: 2057-2065, 1991).

The claims are drawn to an isolated DNA molecule comprising a DNA sequence encoding a JAK kinase capable of undergoing tyrosine phosphorylation by at least one cytokine, an expression vector comprising the same, and a host cell transformed with the expression vector.

Harpur et al. disclose the isolation of a cDNA clone encoding for an extensive portion of murine JAK2 comprising the two putative kinase domains (See abstract and Fig. 1). Wilks et al. teach the isolation of a full length human JAK1 kinase cDNA encoding for a novel protein comprising two phosphotransferase-related catalytic domain (See abstract and Fig. 2). None of the references teaches the cloning of the disclosed cDNA sequences into an expression vector or a host cell transformed with said expression vector. However, the subcloning of cDNA molecules into expression vectors and the making of host cells transformed with the expression vectors are methods common to molecular biology and these would have been within the scope of skills of an ordinary artisan at the time of the instant invention. One of ordinary skilled in

the art would have been motivated to carry out the subcloning of the cDNA sequences disclosed by Harpur et al. and Wilks et al. into an expression vector and transformed a cell with such a vector for further biochemical characterization of these novel tyrosine kinases, and particularly the precise involvement of these kinases in various signal transduction pathways. As the compositions claimed were obvious at the time of filing to an ordinary skilled artisan, the ability of an extensive encoded portion of murine JAK2 kinase and a full length encoded human JAK1 kinase to undergo tyrosine phosphorylation by at least one cytokine would also have been obvious.

Therefore, the claimed invention as a whole was *prima facie* obvious in the absence of evidence to the contrary.

It should be noted that Wilks et al. (U.S. Patent No. 5,658,791 with the effective filing date of June 30, 1993) disclose the same teachings as those of Harpur et al. (Oncogene 7:1347-1353, 1992).

Claims 35 and 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al. (Proc. Natl. Acad. Sci. 91:6374-6378, 1994) or Takahashi & Shirasawa (FEBS Letters 342:124-128, 1994).

The claims are drawn to an isolated DNA molecule comprising a DNA sequence encoding JAK3 kinase or a JAK3 kinase peptide, wherein said peptide has JAK kinase activity and undergoes tyrosine phosphorylation by at least one cytokine, an expression vector comprising the same isolated DNA molecule and an isolated host cell comprising the expression vector.

Kawamura et al. teach molecular cloning of human L-JAK (JAK3) cDNA encoding for a kinase comprising two tandem nonidentical catalytic domains with a molecular weight of about 125,000 Da (See abstract, Fig. 1 and the disclosed GenBank accession no. U09607 at the bottom of page 6374). Takahashi & Shirasawa disclose a cDNA encoding for rat JAK3 kinase comprising a protein tyrosine kinase domain and a second kinase-related domain characteristic of JAK kinase (See abstract and Fig. 1 with the disclosed GenBank accession no. D28508). None of the references teaches the cloning of the disclosed cDNA sequences into an expression vector or a host cell transformed with said expression vector. However, the subcloning of cDNA molecules into expression vectors and the making of host cells transformed with the expression vectors are methods common to molecular biology and these would have been within the scope of skills of an ordinary artisan at the time of the instant invention. One of ordinary skilled in the art would have been motivated to carry out the subcloning of the cDNA sequences disclosed by Kawamura et al. and Takahashi & Shirasawa into an expression vector and transformed a cell with such a vector for further biochemical characterization of the human and rat JAK3 kinases, and particularly the precise involvement of these kinases in various signal transduction pathways. As the compositions claimed were obvious at the time of filing to an ordinary skilled artisan, the ability of encoded human and rat JAK3 kinases to undergo tyrosine phosphorylation by at least one cytokine would also have been obvious.

Therefore, the claimed invention as a whole was *prima facie* obvious in the absence of evidence to the contrary.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 26, 30, 35-37, 39-42, 45-47 and 49-51 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 6,136,595. Although the conflicting claims are not identical, they are not patentably distinct from each other. This is because an isolated DNA molecule comprising a DNA sequence encoding JAK3 kinase or a JAK3 kinase peptide, wherein said peptide has JAK kinase activity and undergoes tyrosine phosphorylation by at least one cytokine, an expression vector and an isolated host cell comprising the same DNA molecule, an isolated DNA molecule wherein said DNA molecule hybridizes to a DNA sequence encoding amino acid SEQ ID NO:16 under conditions recited in the claim, and an isolated DNA molecule wherein said molecule encodes a JAK3 kinase polypeptide that is at least 80-99% homologous to the amino acid sequence of SEQ ID NO:16 wherein the percent homology is determined using a

GAP computer program having recited default parameters in the present application **are obvious over** an isolated DNA molecule comprising a DNA sequence encoding the JAK3 kinase amino acid sequence of SEQ ID NO:16, an isolated DNA molecule wherein said molecule encodes a JAK3 kinase that is at least 80%, 80-99%, 95% or 99% homologous to the amino acid sequence of SEQ ID NO:16, an expression vector and an isolated host cell comprising any of the isolated DNA molecule, in the issued U.S. Patent No. 6,136,595. The JAK kinase activity as well as the ability undergoing tyrosine phosphorylation by at least one cytokine are inherent properties of the encoded polypeptides. Similarly, claims directed to an isolated DNA molecule comprising a DNA sequence encoding a JAK kinase capable of undergoing tyrosine phosphorylation by at least one cytokine, the same wherein said molecule encodes a polypeptide having one conservative amino acid substitution, an expression vector comprising said isolated DNA molecule of the present application **are obvious over** claims 1, 2 and 7 of U.S. Patent No. 6,136,595 because they encompass all the scope of the claims in the issued patent.

Conclusions

No claim is allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang Nguyen, Ph.D., whose telephone number is (703) 308-8339.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's mentor, Deborah Crouch, Ph.D., may be reached at (703) 308-1126, or SPE, Karen Hauda, at (703) 305-6608.

Any inquiry of a general nature or relating to the status of this application should be directed to Patent Analyst, Patsy Zimmerman, whose telephone number is (703) 305-2758.

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